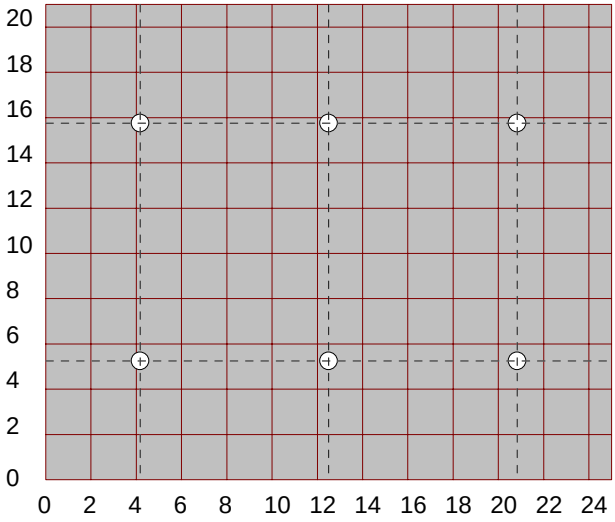
Air distribution design

Project data :

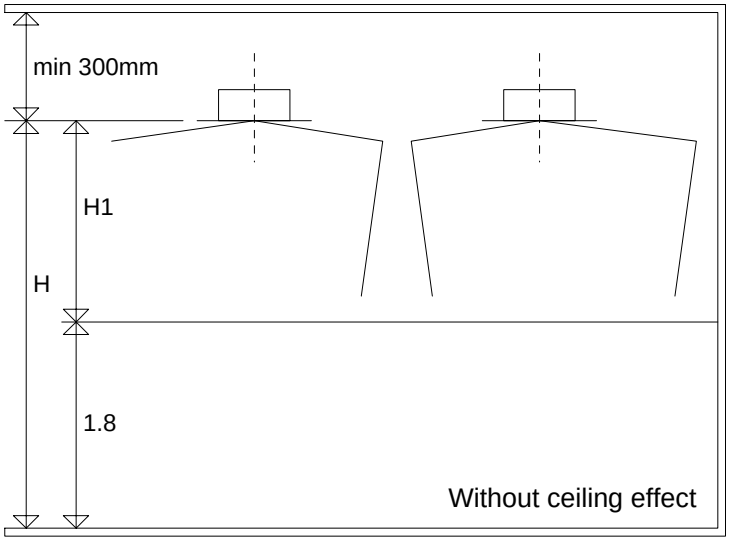
Name of the project : Example 5 - 25x21m / Summer conditions
Customer :
Reference :
Designed by : IMP Klima d.o.o.
Information : Typ OD-11

Placement of the diffusers :



dl=8.33m db=10.50m X1=4.17m X2=4.17m X3=5.25m X4=5.25m nl=3 nb=2

Definitions :



Vol [m3/h] : Air flow rate at the diffuser
dl, db [m] : Distance between the diffusers
X1, X2, X3, X4 [m] : Distance between the diffuser and the wall
H [m] : Installation height of the diffuser
H1 [m] : Distance between the diffuser and the stand level
h1 [m] : Throw of the diffuser
LWA [dB(A)] : A-weighted sound power level
LpA [dB(A)] : A-weighted sound pressure level in room
dpt [Pa] : Pressure drop at the diffuser
Angle [°] : Angle of the vanes (Angle=0° - closed)

Placement of the diffusers :
dl [m] : Distance along long side of the space
db [m] : Distance along broad side of the space
X1 [m] : Distance from the left wall
X2 [m] : Distance from the right wall
X3 [m] : Distance from the lower wall
X4 [m] : Distance from the upper wall
nl [m] : Number of diffusers along long side of the space
nb [m] : Number of diffusers along broad side of the space

Space :

height = 7.0m
length = 25.0m
width = 21.0m
floor = 525.0m2
volume = 3675.0m3

Placement :

dl = 8.33m
db = 10.50m
X1 = 4.17m
X2 = 4.17m
X3 = 5.25m
X4 = 5.25m
nl = 3
nb = 2

Design criteria :

Optimal operative temperature : 18.0°C
Permissible air velocity in occupied zone : 0.20m/s
Required supply air flow rate : 7.9l/s m2 floor
Required supply air flow rate in space : 4167l/s
Air change coefficient : 4.1/h
Sound pressure level : 45dB(A)
Sound increment : 3dB
Reverberation time : 1.0s
Occupied zone : 1.8m
Supply air temperature : 9.0°C
Temperature difference : -9.0°C

Calculation results for cooling :

Diffuser type : OD-11 500
Diffuser air flow rate : Vol = 694.5l/s (2500.2m3/h)
Angle of the vanes : Angle = 35°
Throw of the diffuser : h1 = 3.6m
Installation height of the diffuser : H = 5.5m
Pressure drop on the diffuser : dpt = 62.3Pa

Sound power level of the diffuser :
LW63 = 56dB LW125 = 55dB LW250 = 53dB LW500 = 50dB
LW1000 = 46dB LW2000 = 31dB LW4000 = 18dB LW8000 = 10dB
LWA = 50.8dB(A)

Sound pressure level in space at 1.8m :
Lp63 = 43dB Lp125 = 42dB Lp250 = 40dB Lp500 = 37dB
Lp1000 = 33dB Lp2000 = 19dB Lp4000 = 1dB Lp8000 = 0dB
LpA = 38.2dB(A)